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*Avogadro and Dalton: The Standing in Chemistry of Their Hypotheses.* By ANDREW N. MELDRUM, D.Sc. Edinburgh: Wm. F. Clay, 1904. Pp. 113. 3s.

There has been considerable difference of opinion in regard to the rôles which the hypotheses of Dalton and Avogadro have played in shaping the beliefs of modern chemistry. It is the aim of Dr. Meldrum's essay to show that our present chemistry rests upon the molecular conception, with Avogadro's hypothesis as its guiding principle; and to point out that the features of Dalton's atomic hypothesis, at least in its original form, are to be recognized with difficulty in the modern atomic theory.

Although Dalton's hypothesis preceded Avogadro's hypothesis in order of time, nevertheless the hope which Dalton had of determining for the relative atomic weights, numerical values which all chemists could agree upon, was not, and could not be, realized until Avogadro's molecular conception, after many years of objection and hesitation, was carried to its logical conclusion by Gerhardt and Laurent, Cannizzaro, and others. As a result of this change of view, "the extreme confusion" which prevailed in chemistry about the year 1860 was dispelled "almost as if by magic."

The preparation and publication of this interesting essay was made possible by a grant from the Carnegie trustees. The following brief outline may serve to give some idea of its scope: Part I deals with the origin, meaning, and conclusions of Avogadro's hypothesis as a "principle of chemistry." In Part II Dr. Meldrum discusses the atomic hypothesis of Dalton. In a clear manner he shows how, in succession, new interpretations were forced upon it "in the four great systems of chemistry"—those of Berzelius, Gmelin, Gerhardt, and Laurent and Cannizzaro—until, finally, the atomic theory in its present form was reached. The closing chapter presents Dr. Meldrum's views concerning the relative standing of Dalton's hypothesis and Avogadro's hypothesis. He opposes the attempts which some chemists have made to identify Dalton's atom "with this or that conception of modern chemistry," either atom, or molecule, or a confused mixture of the two. He criticises the statement of Divers, "that Dalton's atom is the modern molecule," and is equally severe with Ostwald's view, that modern chemistry is a product of the molecular hypothesis and the atomic hypothesis, in which the molecular hypothesis "has played a similar, though not so important a part in the development of the science as the atomic hypothesis." In conclusion Dr. Meldrum says: "Dalton's atom, incompatible, as Dalton himself saw, with Avogadro's hypothesis, was a unique conception which reigned supreme during the epoch of gravimetric chemistry, and which, from its very nature, was abandoned when Avogadro's hypothesis was adopted. The atom in the modern theory of chemistry is a dependency upon the molecule. . . . The atom can be defined with reference to the molecule; it is doubtful if any other definition is sufficient.

The conclusions reached by Dr. Meldrum are founded upon a wide range of reading in the historical literature, and upon a careful comparison of the views and statements as they are presented at first-hand by the authors themselves. In almost all cases his opinions are supported by quotations which show plainly the interpretation which the original author intended should be put upon the recorded facts. The book will be of value to all who are interested in a presentation of the historical stages through which some of the fundamental principles of the science of chemistry have developed.

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